

## ABSTRACT OF THE DISCLOSURE

A magnetic recording system is provided having a write head employing a combination of magnetic write field gradient and thermal gradient to write data on a 'thermal spring' magnetic recording media. The write head comprises a magnetic element using a write current to induce a magnetic write field at the magnetic media and a thermal element using a very small aperture laser to heat a portion of the media. The thermal spring magnetic media comprises first and second stacks providing two exchange coupled ferromagnetic layers having different Curie temperatures. The first stack has a high magneto-crystalline anisotropy, a relatively low saturation magnetization and a low Curie temperature. The second stack has a relatively low magneto-crystalline anisotropy, a high saturation magnetization and a high Curie temperature. The magnetic field gradient and the thermal gradient are arranged to substantially overlap at the trailing edge of the heated portion of the magnetic media allowing data at high density with high thermal stability to be recorded on the rapidly cooling thermal spring magnetic recording media.